

An Easy Pocket
Star Guide
For Beginners

A Key to the Sky
for Every Night
in the Year

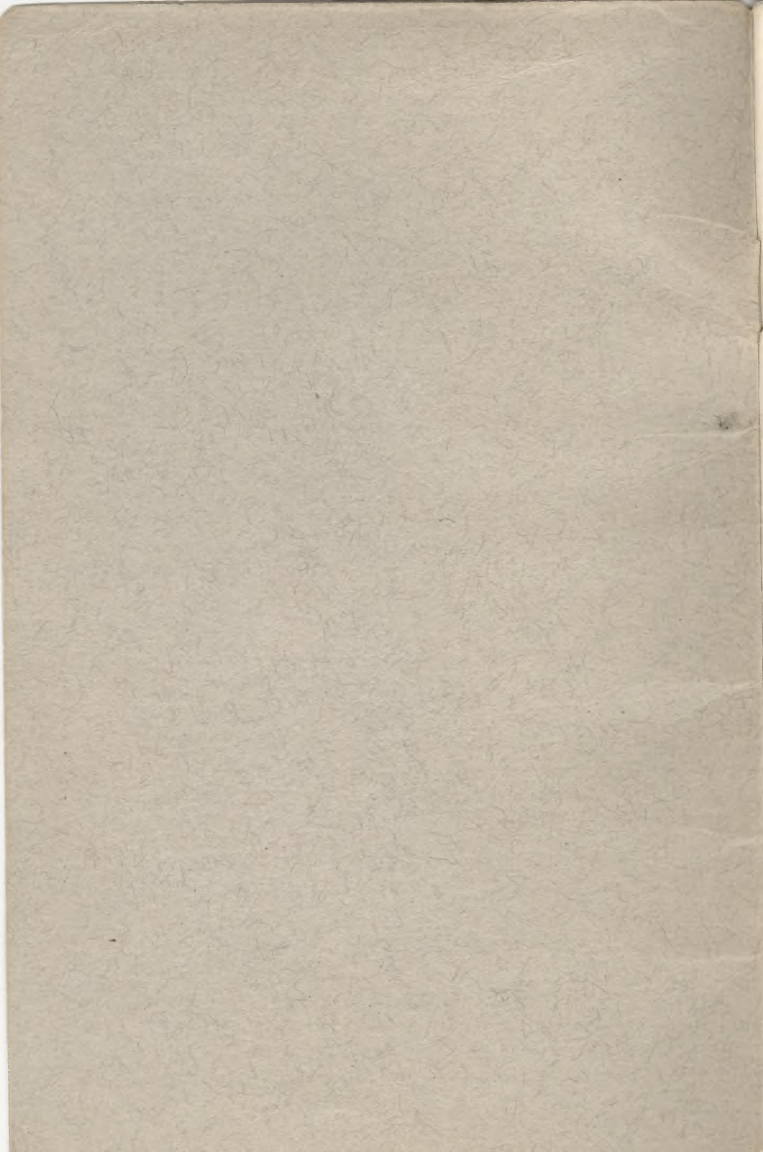


Compiled by

H. R. KINGSTON

Plates from

McKready's "A Beginner's Star-Book"



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H. R. KINGSTON, M.A., PH.D., F.R.A.S.

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By permission, from plates in McKready's
"A Beginner's Star-Book," an Easy Guide to
the Stars, and to the Astronomical Uses of the
Opera Glass, the Field Glass and the Telescope.
—G. P. Putnam's Sons, New York.



The Hume Cronyn Memorial Observatory
University of Western Ontario
London, Canada

THE STARS

and How to Know Them

“What are the stars?” and “How far away are they?” are questions asked by the most casual observers of the skies. The answer is that the stars are suns, most of them millions of times as far away as our sun. They are at such immense distances that although they are moving around among themselves at great speeds, yet no shift of their relative positions with respect to one another can be detected with the naked eye in a lifetime and they are therefore often referred to as the “fixed stars.” Hence the starry skies present the same pattern (except for the planets) over long, long periods of time. This fact makes it extremely easy to become familiar with the brighter stars and star groups.

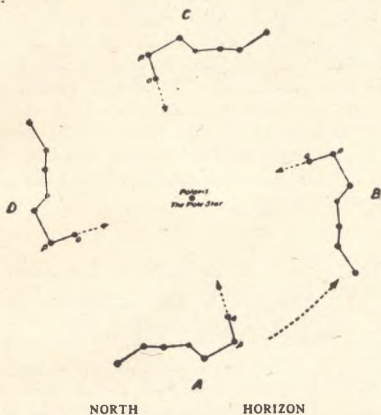
One of the stars is our sun and it looks large because it is, relatively speaking, so very close to us, being only 93 million miles away. The fact is that the sun is actually one of the small stars, most stars being much greater in size and some of them millions of times as large.

The nearest known star, other than our sun, is named Proxima Centauri. It is 280,000 times as far away as the sun, or at a distance of 26 million times a million miles. Travelling at a mile a minute one would require 180 years to journey to our sun, but 48 million years to reach the nearest star! The greatest speed known in the universe is that of light or of a radio wave, which travels at the rate of eight times around the earth in one second or eleven million miles in one minute. At this almost unthink-

able speed a trip to the sun would consume only eight minutes, but the journey to the nearest star would take four years and four months! Thus we say that Proxima is $4 \frac{1}{3}$ light-years away. Moreover, some stars are thousands of times as distant as Proxima.

All the stars in our "Galaxy" or "Universe" constitute an immense system in the form of a giant rotating ferris-wheel, our sun being a star about two-thirds of the way out from the centre toward the rim. When, from our earthly point of observation near the sun, we look out at our universe the stars appear much more numerous in the Milky Way than in other parts of the sky. The reason for this is that we are then looking through the greater depth of stars in the direction of the rim of the wheel. It has been estimated that there are enough stars in our Galaxy to provide 200 for each man, woman and child in the world today—and the population of the world is approximately 2,000 million! However, only about 5,000 stars are visible to the naked eye.

To understand the motion of the stars we must remember that our earth rotates on its axis from west to east and this causes the sky to appear to revolve around us from east to west each twenty-four hours. Since the earth's axis points very closely to Polaris (the North Star or Pole Star), this motion of the stars is around Polaris as centre. Hence, in our middle north latitudes, the stars near Polaris, for example those in the Big Dipper, revolve each day in a counter-clockwise direction around the North Star without setting, as in the following figure. Actually the time required for one revolution is four minutes less than twenty-four hours (see bottom of p. 8).



Four Positions of the Dipper

The Big Dipper (above) is in position

- A at 10 p.m. on Nov. 1st
and 10 a.m. on May 1st;
- B at 4 a.m. on Nov. 1st
and 4 p.m. on May 1st;
- C at 10 a.m. on Nov. 1st
and 10 p.m. on May 1st;
- D at 4 p.m. on Nov. 1st
and 4 a.m. on May 1st.

The North Star may always be found from the "Pointers" (α and β) of the Big Dipper. The point on the horizon directly below Polaris gives the observer his north direction; directly opposite this is south, etc. Many lives have been saved by a knowledge of this method of determining directions.

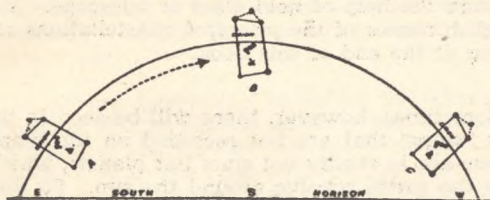
The North Star remains in the same place in the sky as long as the observer does not change

his latitude. If the observer journeys north, Polaris rises higher and higher and would be directly overhead if viewed from the North Pole of the Earth. Thus, for example, at Winnipeg (lat. 50°) the North Star is about seven degrees higher than at London, Ontario (lat. 43°). The height (in degrees) of the North Star above the horizon is always equal to the latitude of the observer. This fact is fundamental in navigation and surveying.

Stars that are a little farther from the North Star than the Big Dipper rise daily in the north-east, pass high across the sky and set in the north-west. Stars at a still greater distance from Polaris rise in the east or south-east, ride across the sky at a lower height and set in the west or south-west. These motions are similar to those of the sun and the moon and may be verified in a few hours on any bright evening. If the observer faces south this east-to-west motion of the southern sky is in the clockwise direction. Stars that are very far south never rise above the horizon for observers in Canada and the northern part of the United States and are therefore invisible to us unless we travel south. For example, to see the Southern Cross we must be as far south as the southern part of Florida.

Again, because of the yearly motion of the earth around the sun, the stars appear a little farther west at the same time on successive evenings, or, what is the same thing, they appear at the same place a little earlier (four minutes) on each successive evening. Thus at the end of a month they will come to the same position one hundred and twenty minutes or two hours earlier. This is the cause of the seasonal changes in the skies, as illustrated on page 7 and also in the

figure below. In this figure the point S is directly south on the horizon. Hence the observer with his back to the North Star is facing S, with east on his left and west on his right.



Three Positions of Orion

The beautiful constellation Orion is in position

- A at 6.30 p.m. on Jan. 1st
and 2.30 p.m. on Mar. 1st;
- B at 11.00 p.m. on Jan. 1st
and 7.00 p.m. on Mar. 1st;
- C at 3.30 p.m. on Jan. 1st
and 11.30 p.m. on Mar. 1st.

Each star-chart in this book represents the sky at various times in the evening over a period of two months; and below it appears the corresponding key-map. The midpoint of the top of each map corresponds approximately to the point of the sky directly overhead; the bottom of the map represents the horizon. Note that for each date there are two pairs of maps, one pair for facing south. and one pair for facing north. To use the Guide on any evening find the map with the nearest date. and at the (standard) time annexed, hold the "facing south" map or the "facing-north" map up to the sky, and you will be able to identify at once some of the brighter stars. Starting from these it is an easy matter to find all the visible stars and constellations

(star groups). With the aid of a pocket flashlight which may be turned on the map while held in position against the sky, the observer will "make friends" with the stars in a very few minutes. Clusters and nebulae (marked "o") require the help of field glass or telescope. The English names of the principal constellations are given at the end of this book.

Sometimes, however, there will be seen in the sky "stars" that are not recorded on the maps. These are in reality not stars but planets, which, like the earth, revolve around the sun. So they move around the sky passing slowly among the stars. They (and also the moon and sun) always lie in a narrow belt stretching around the sky, called the Zodiac, which contains the following twelve constellations: Aries, Taurus, Gemini, Cancer, Leo, Virgo, Libra, Scorpio, Sagittarius, Capricornus, Aquarius, Pisces. These may be easily found on the south star-maps. The sun moves in an easterly direction through one of these each month, being in Aries in April, in Taurus in May, etc. The English names of these constellations and their order may be remembered readily from the following rhyme:

The Ram, the Bull, the Heavenly Twins,
And next the Crab the Lion shines,
The Virgin and the Scales,
The Scorpion, Archer and Sea-Goat,
The Man who doth the water tote
And Fish with glittering tails.

Of the five planets visible to the naked eye, Mercury is always close to the sun, but when not too close to be lost in his rays, may be seen sometimes in the west in the evening immediately after sunset, and sometimes in the east in

the morning just before sunrise. The other four—Venus, Mars, Jupiter and Saturn—may be located roughly from the table on the following page. A planet may move out of one constellation into an adjoining one during the month in question, and if it be not within the constellation indicated, it will be near enough to make identification easy.

It is very interesting to follow the changing positions of the planets as they move through the stars of the Zodiac. On the average Venus passes across one constellation in about $1\frac{1}{2}$ months and Mars in 2 months, while slow-moving Jupiter and Saturn require respectively 1 year and $2\frac{1}{2}$ years to do this.

I wish to express here my sincere appreciation of the permission to use the plates in McKready's "A Beginner's Star-Book"—a book which I most heartily recommend to any observer.

This little "Star-Guide" has been prepared mainly for the use of the students in my classes in astronomy, and if it helps them, and others into whose hands it may fall, to become familiar with the stars, and creates a desire to learn more about the wonders of the heavens, its purpose will have been achieved.

H. R. KINGSTON.

University of Western Ontario,
London, Canada,
July, 1947.

POSITIONS OF PLANETS TO 1959

NOTE:—When two constellations are given, the planet is near the boundary or is passing from one to the other.
 Aqr=Aquarius; Ari=Aries; Cnc=Cancer; Cap=Capricornus; Gem=Gemini; Leo=Leo; Lib=Libra;
 Psc=Pisces; Sgr=Sagittarius; Sco=Scorpius; Tau=Taurus; Vir=Virgo.

YEAR	PLANET	JANUARY	MARCH	MAY	JULY	SEPTEMBER	NOVEMBER
1947	Venus Mars Jupiter Saturn	Sco Sgr Sgr Lib Cnc	Cap Aqr Lib Cnc	Psc Psc Lib Cnc	Gem Tau Lib Cnc	Leo Vir Gem Lib Cnc	Sco Sgr Leo Sco Leo
1948	Venus Mars Jupiter Saturn	Cap Aqr Leo Sco Sgr Leo	Ari Leo Sgr Cnc	Gem Leo Sgr Cnc	Tau Gem Vir Sco Sgr Leo	Cnc Lib Sco Sgr Leo	Vir Sco Sgr Sgr Leo
1949	Venus Mars Jupiter Saturn	Sgr Cap Sgr Leo	Aqr Psc Sgr Leo	Tau Ari Cap Leo	Cnc Tau Cap Leo	Vir Cnc Sgr Leo	Sgr Leo Sgr Leo
1950	Venus Mars Jupiter Saturn	Cap Aqr Vir Cap Leo	Cap Aqr Vir Cap Leo	Psc Leo Aqr Leo	Tau Vir Aqr Leo	Leo Lib Aqr Leo	Lib Sgr Aqr Vir
1951	Venus Mars Jupiter Saturn	Cap Aqr Cap Aqr Cap Aqr Vir	Psc Psc Psc Vir	Gem Tau Psc Leo Vir	Leo Gem Cnc Psc Leo Vir	Leo Leo Psc Vir	Vir Leo Vir Psc Vir
1952	Venus Mars Jupiter Saturn	Sco Vir Cap Aqr Vir	Cap Aqr Lib Psc Vir	Ari Vir Ari Vir	Gem Cnc Vir Ari Vir	Vir Sco Ari Vir	Sgr Sgr Ari Vir

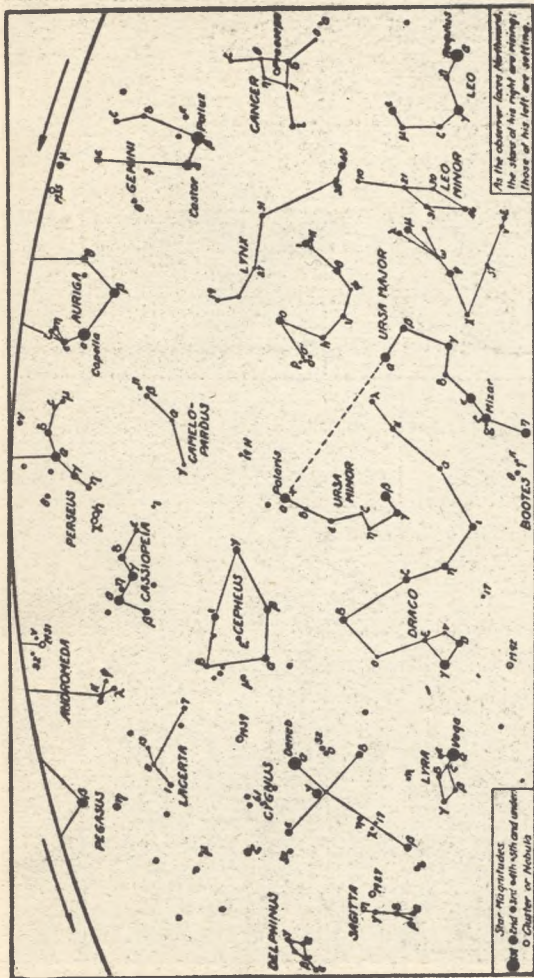
1953	Venus Mars Jupiter Saturn	Cap Aqr Cap Aqr Ari Vir	Psc Ari Psc Ari Ari Vir	Psc Tau Tau Vir	Tau Gem Cnc Tau Vir	Cnc Leo Leo Tau Vir	Vir Lib Vir Tau Vir
1954	Venus Mars Jupiter Saturn	Sgr Cap Lib Tau Vir Lib	Psc Sco Tau Lib	Tau Gem Sgr Tau Gem Lib Vir	Cnc Leo Sgr Sco Gem Vir	Vir Lib Sgr Gem Vir Lib	Sco Lib Cap Gem Cnc Lib
1955	Venus Mars Jupiter Saturn	Sco Psc Gem Lib	Cap Aqr Ari Gem Lib	Psc Ari Tau Gem Gem Lib	Gem Cnc Gem Cnc Cnc Lib	Leo Vir Leo Cnc Leo Lib	Sco Vir Leo Lib
1956	Venus Mars Jupiter Saturn	Cap Aqr Lib Sco Leo Lib Sco	Psc Ari Sgr Leo Sco	Tau Gem Cap Leo Sco Lib	Tau Gem Aqr Psc Leo Lib	Gem Cnc Aqr Leo Lib	Vir Psc Leo Vir Sco
1957	Venus Mars Jupiter Saturn	Sco Sgr Psc Vir Sco	Aqr Psc Ari Tau Vir Sco	Tau Gem Leo Sco	Cnc Leo Cnc Leo Leo Vir Sco	Vir Lib Leo Vir Vir Sco	Sco Sgr Vir Lib Vir Sco
1958	Venus Mars Jupiter Saturn	Cap Sco Vir Sco	Cap Sgr Cap Vir Sco	Psc Aqr Psc Vir Sco	Tau Gem Psc Ari Vir Sco	Leo Ari Tau Vir Sco	Lib Sco Tau Ari Lib Sco
1959	Venus Mars Jupiter Saturn	Sgr Cap Ari Lib Sco Sgr	Psc Ari Psc Tau Sgr	Tau Gem Gem Sco Lib Sgr	Leo Leo Lib Sgr	Leo Vir Lib Sco Sgr Sco	Vir Lib Sco Sgr

The middle of the top of this map is approximately the point overhead (zenith) at the times given below, and a line from zenith down through Polaris is always directly north. Bottom edge of map is north horizon from west around to east.



NIGHT-CHART TO THE SKY AS THE OBSERVER FACES NORTH.
JAN. 1. 8 P.M., DEC. 15. 9 P.M., DEC. 1. 10 P.M., NOV. 15. 11 P.M., NOV. 1. 12 P.M.

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Star magnitudes
 ● 1st to 3rd with 4th and under
 ○ Cluster or Nebula

As the observer faces Northward,
 the stars at his right are rising;
 those at his left are setting.

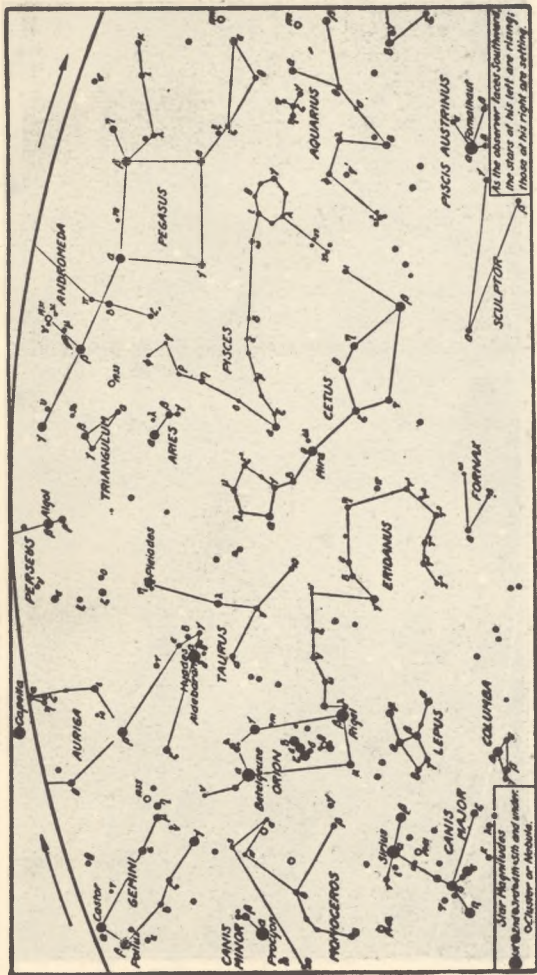
KEY-MAP TO THE SKY AS THE OBSERVER FACES NORTH.
 JAN. 1, 8 P.M., DEC. 16, 9 P.M., DEC. 1, 10 P.M., NOV. 15, 11 P.M., NOV. 1, 12 P.M.

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NIGHT-CHART TO THE SKY AS THE OBSERVER FACES SOUTH.
JAN. 1, 8 P.M., DEC. 15, 9 P.M., DEC. 1, 10 P.M., NOV. 16, 11 P.M., NOV. 1, 12 P.M.

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JAN. 1, 8 P.M.
DEC. 19, 9 P.M.
DEC. 1, 10 P.M.
NOV. 15, 11 P.M.
NOV. 1, 12 P.M.

Star Myzimidæ
 near the bottom south end under
 October or November.

As the observer faces Southward,
 the stars at his left are rising!
 Those at his right are setting.

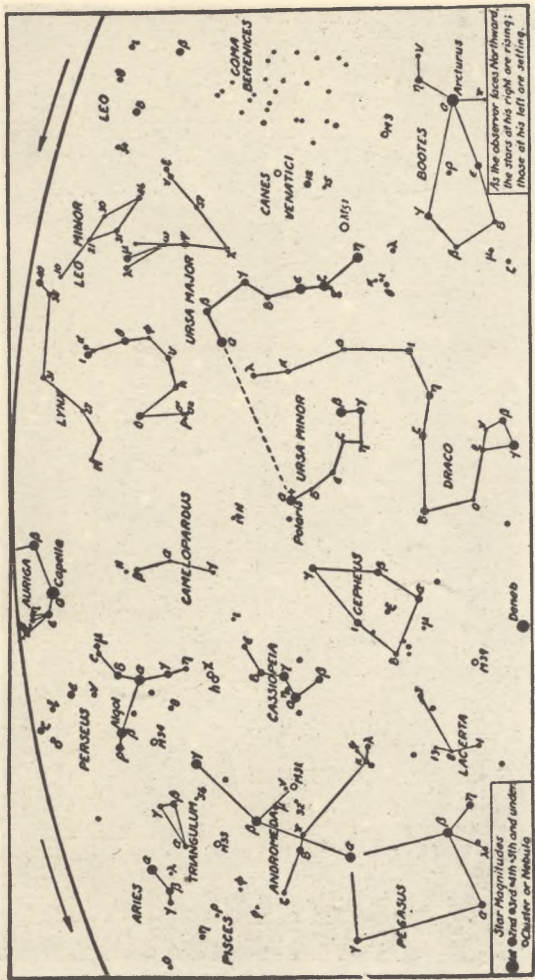
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NIGHT-CHART TO THE SKY AS THE OBSERVER FACES NORTH.

MARCH 1, 8 P.M., FEB. 15, 9 P.M., FEB. 1, 10 P.M., JAN. 15, 11 P.M., JAN. 1, 12 P.M.

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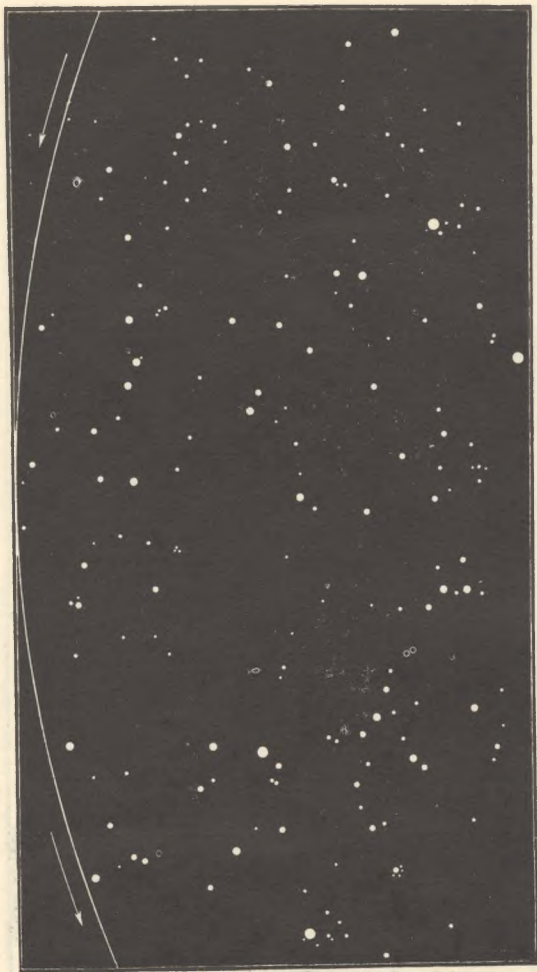
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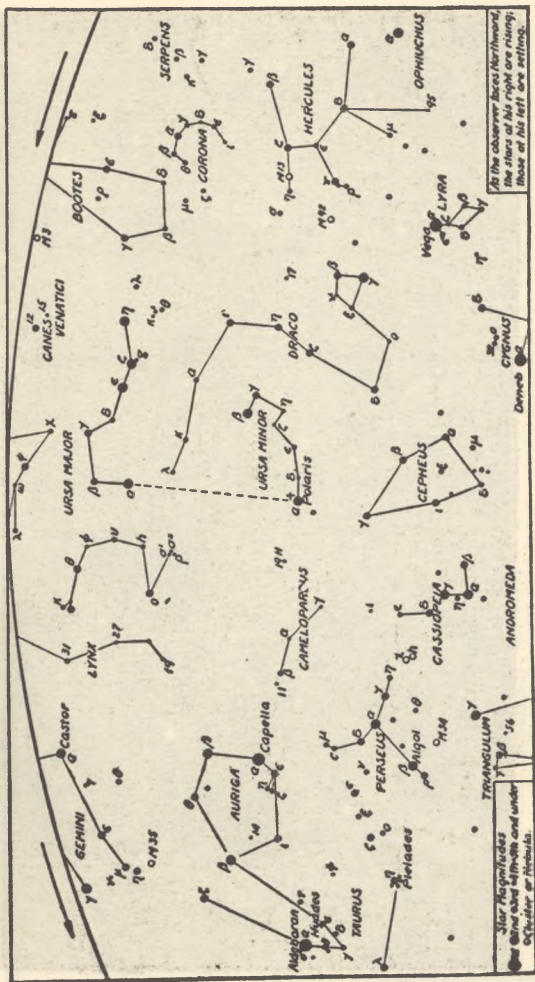
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MAY 1, 9 P.M.; NIGHT-CHART TO THE SKY AS THE OBSERVER FACES NORTH.
APRIL 15, 9 P.M.; APRIL 1, 10 P.M.; MARCH 16, 11 P.M.; MARCH 1, 12 P.M.

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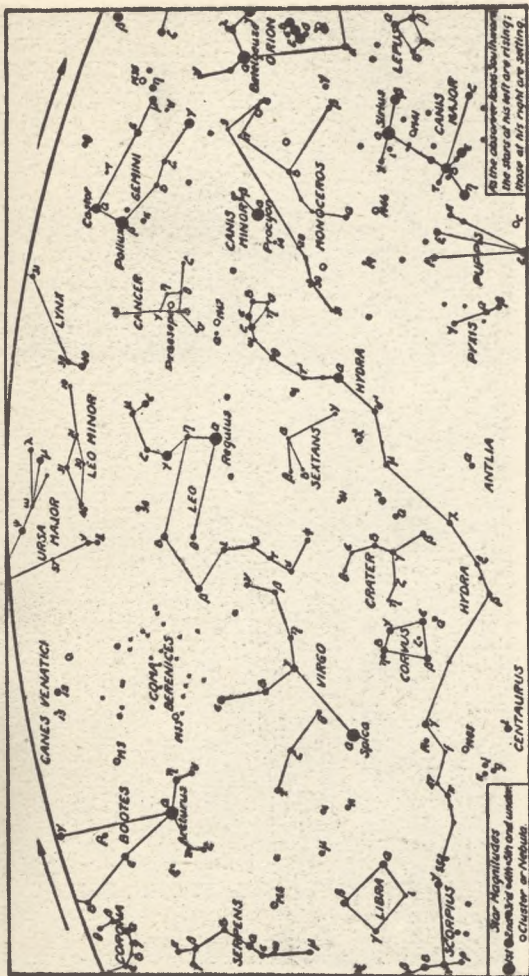
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MAY 1, 0 P.M.; APRIL 16, 9 P.M.; APRIL 1, 10 P.M.; MARCH 16, 11 P.M.; MARCH 1, 12 P.M.

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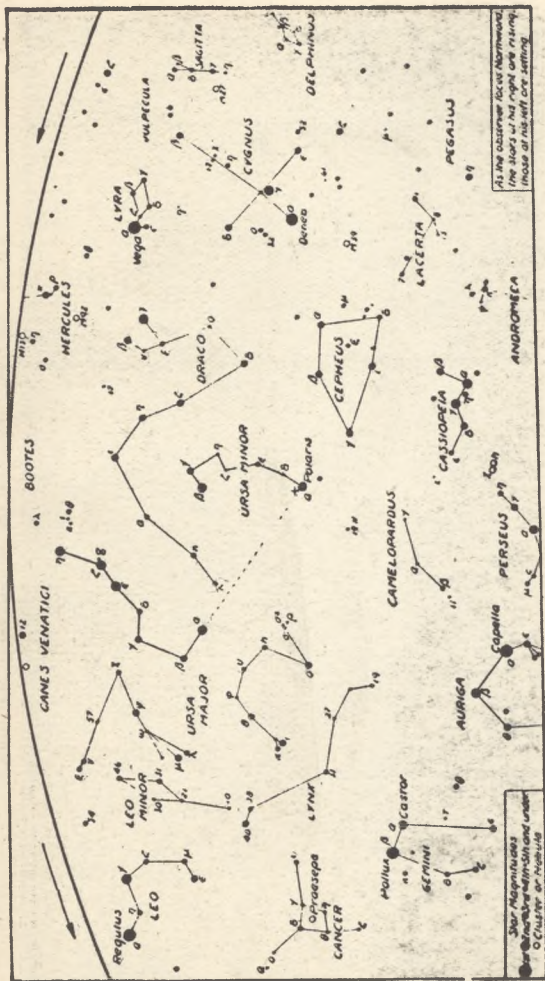
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 MAY 1, 8 P.M., APRIL 16, 9 P.M., APRIL 1, 10 P.M., MARCH 16, 11 P.M.,
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NIGHT-CHART TO THE SKY AS THE OBSERVER FACES NORTH.
JULY 1, 8 P.M., JUNE 15, 9 P.M., JUNE 1, 10 P.M., MAY 15, 11 P.M., MAY 1, 12 P.M.

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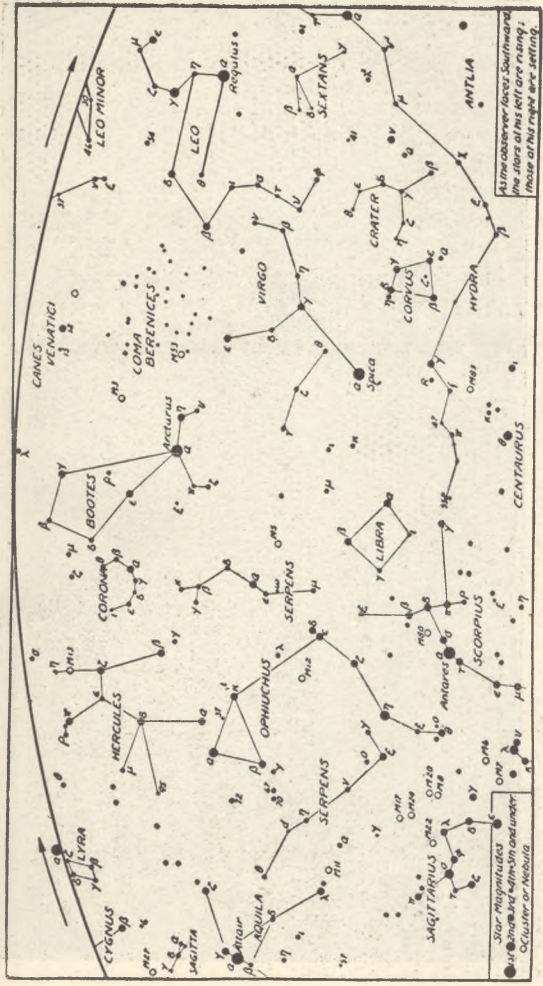
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As the observer faces southward the stars at his left are rising; those at his right are setting.

KEY-MAP TO THE SKY AS THE OBSERVER FACES SOUTH.
 JUNE 15, 9 P.M., JUNE 1, 10 P.M., MAY 15, 11 P.M.,

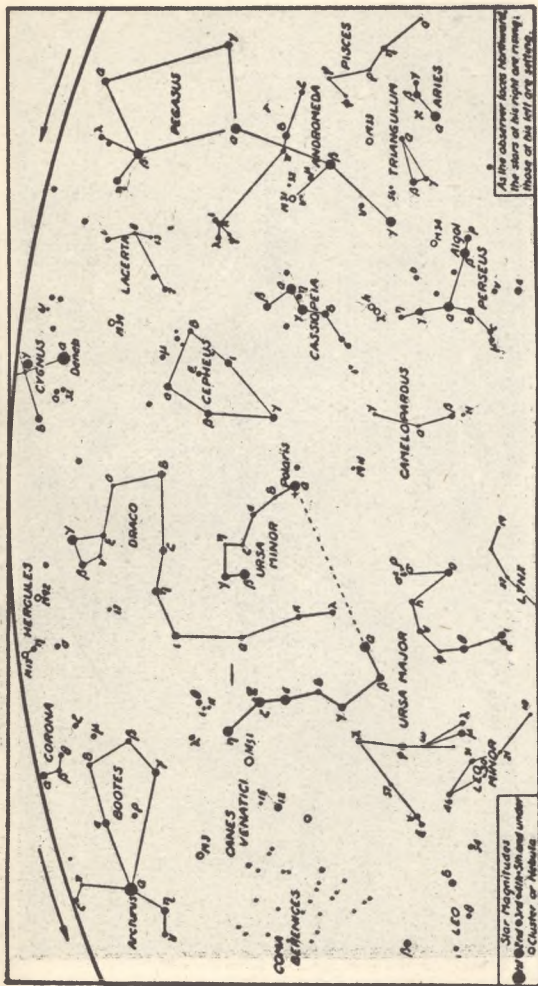
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NIGHT-CHART TO THE SKY AS THE OBSERVER FACES NORTH.
SEPT. 1, 8 P.M.; AUG. 15, 9 P.M.; AUG. 1, 10 P.M.; JULY 15, 11 P.M.; JULY 1, 12 P.M.

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KEY-MAP TO THE SKY AS THE OBSERVER FACES NORTH.

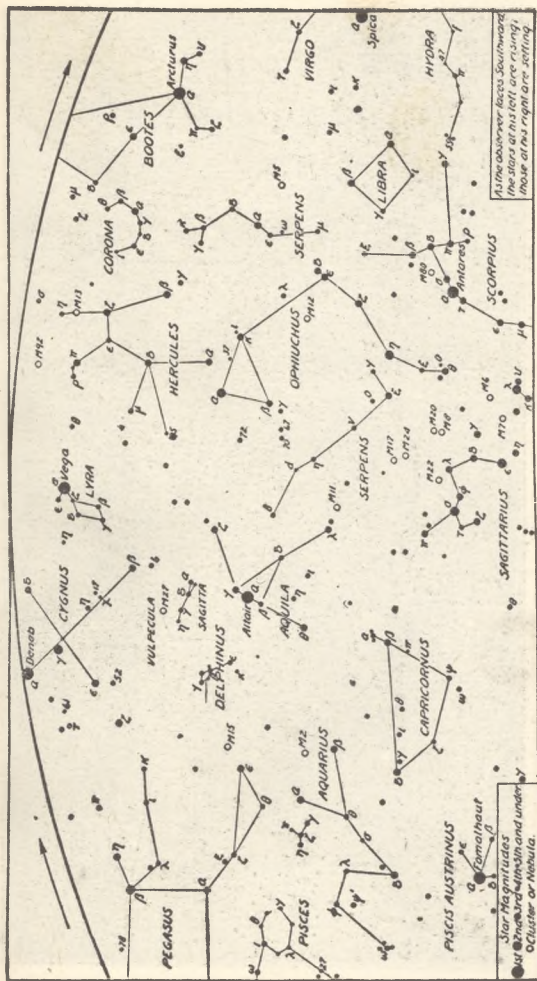
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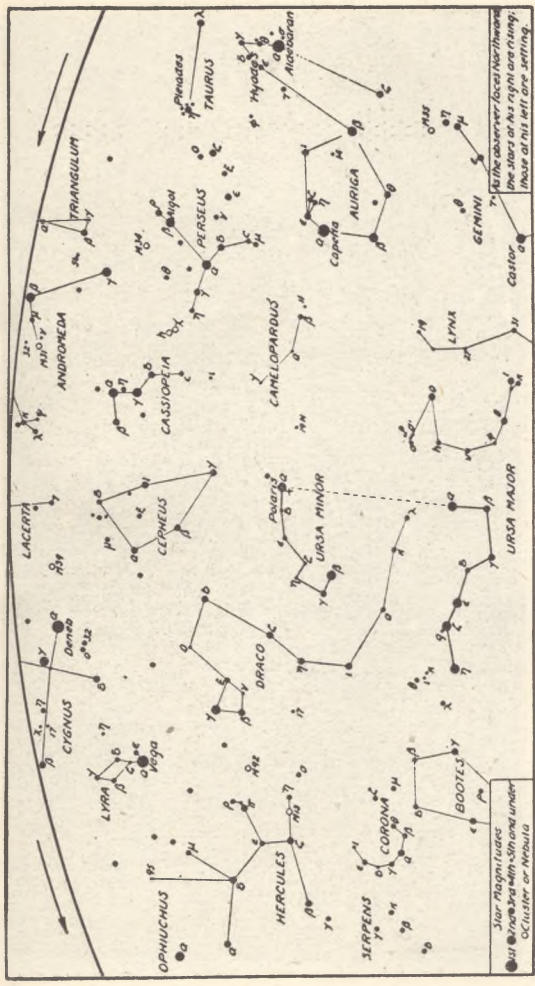
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**NOV. 1, 9 P.M. NIGHT-CHART TO THE SKY AS THE OBSERVER FACES NORTH.
OCT. 15, 9 P.M. OCT. 1, 10 P.M. SEPT. 15, 11 P.M. SEPT. 1, 12 P.M.**

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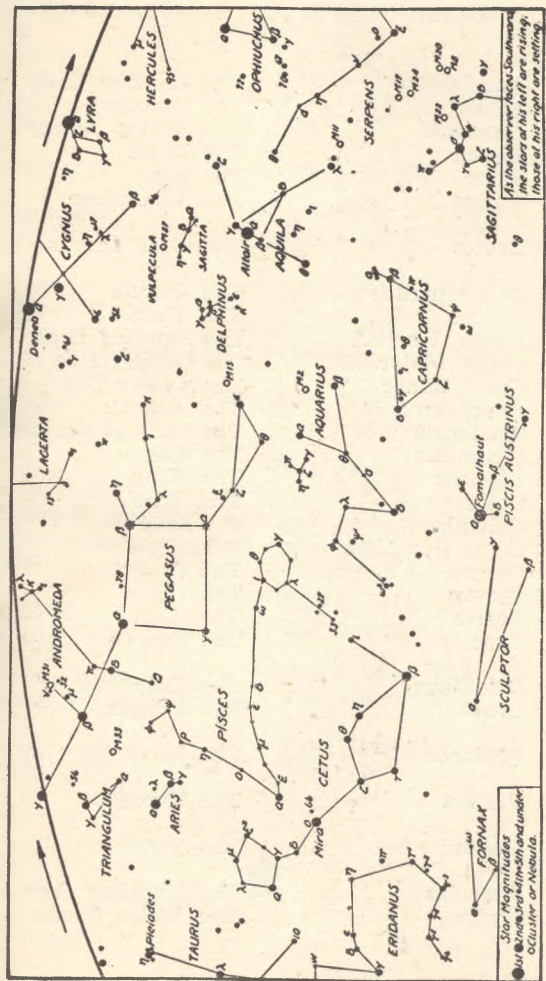
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NIGHT-CHART TO THE SKY AS THE OBSERVER FACES SOUTH.
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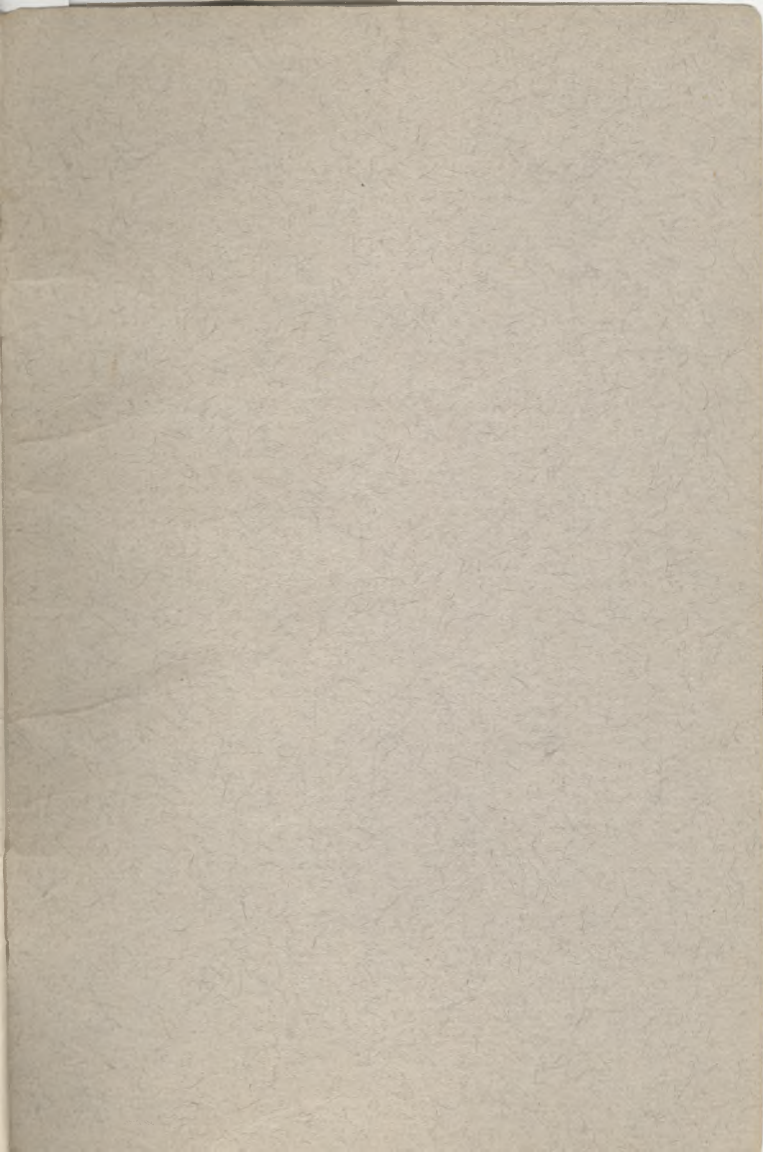
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ENGLISH NAMES OF CONSTELLATIONS

Andromeda	The Chained Lady
Antlia	The Airpump
Aquarius	The Water Bearer
Aquila	The Eagle
Aries	The Ram
Auriga	The Charioteer
Bootes	The Bear Driver
Camelopardus	The Giraffe
Cancer	The Crab
Canes Venatici	The Hunting Dogs
Canis Major	The Greater Dog
Canis Minor	The Lesser Dog
Capricornus	The Sea Goat
Cassiopeia	The Lady in the Chair
Centaurus	The Centaur
Cepheus	The King
Cetus	The Whale
Columba	The Dove
Coma Berenices	Berenice's Hair
Corona	The Crown
Corvus	The Crow
Crater	The Cup
Cygnus	The Swan
Delphinus	The Dolphin
Draco	The Dragon
Eridanus	The River Po
Fornax	The Furnace
Gemini	The Twins
Hercules	The Kneeling Hero
Hydra	The Water Snake

Lacerta	The Lizard
Leo	The Lion
Lepus	The Hare
Libra	The Scales
Lynx	The Lynx
Lyra	The Harp
Monoceros	The Unicorn
Ophiuchus	The Serpent Bearer
Orion	The Giant Hunter
Pegasus	The Winged Horse
Perseus	The Champion
Pisces	The Fish
Piscis Austrinis (Australis)	The Southern Fish
Puppis	The Ship's Stern
Pyxis	The Compass
Sagitta	The Arrow
Sagittarius	The Archer
Scorpius (Scorpio)	The Scorpion
Serpens	The Serpent
Sextans	The Sextant
Taurus	The Bull
Triangulum	The Triangle
Ursa Major	The Greater Bear
Ursa Minor	The Lesser Bear
Virgo	The Virgin
Vulpecula	The Fox





Franklin

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